

Myocardial infarction: secondary prevention of myocardial infarction in primary and secondary care

NICE guideline

Draft for consultation, June 2013

If you wish to comment on this version of the guideline, please be aware that all the supporting information and evidence is contained in the full version.

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Introduction

Myocardial infarction (MI) is one of the most dramatic presentations of coronary artery disease. The usual cause is blockage of a coronary artery producing tissue death and consequently the typical features of a heart attack: severe chest pain, changes on the electrocardiogram (ECG), and elevated concentrations of proteins released from the dying heart tissue into the blood. MIs are divided into 2 types according to their ECG changes:

- ST-segment elevation myocardial infarction (STEMI) generally caused by complete and persisting blockage of the artery
- non-ST-segment elevation myocardial infarction (NSTEMI), reflecting partial or intermittent blockage.

In England and Wales in 2011 more than 79,000 hospital admissions were caused by MI according to the Myocardial Ischaemia National Audit Project (MINAP). Of these 41% were STEMI and 59% NSTEMI. Twice as many men had MIs as women.

People who have had a STEMI or an NSTEMI benefit from treatment to reduce the risk of further MI or other manifestations of vascular disease, known as secondary prevention. Since the late 1990s MINAP has documented the reductions in mortality resulting from changes in acute treatment of MI and the application of secondary prevention measures. While 30-day mortality was almost 13% for STEMI in 2003/04, it fell to 8% in 2011–12 with similar falls for NSTEMI.

NICE clinical guideline 48 was published in 2007, offering comprehensive advice to prevent further myocardial infarction and progression of vascular disease in those who had already had an MI, either recently or in the past (more than 12 months ago). Since 2007, there has been a major change in the management of acute MI, both STEMI and NSTEMI, although more dramatically the former. Primary percutaneous coronary intervention (PPCI) has replaced thrombolysis in most cases of STEMI. This improvement in acute treatment may impact on the efficacy of secondary prevention, hence one reason to update the guideline.

Uptake of cardiac rehabilitation is still low with only 44% of people starting an outpatient cardiac rehabilitation programme in England, Northern Ireland and Wales, after an MI. People also wait an average of 53 days to start an outpatient rehabilitation programme. Interventions which may enhance uptake and adherence to cardiac rehabilitation programmes have been included in the 2013 update.

Drug therapy for secondary prevention is effectively applied nationally, but new findings on antithrombotic therapy, omega-3 fatty acid supplementation, angiotensin-converting enzyme (ACE inhibitors) and beta-blockers have also contributed to a need for this guideline to be updated.

The guideline will assume that prescribers will use a drug's summary of product characteristics to inform decisions made with individual patients.

Patient-centred care

This guideline offers best practice advice on the care of adults who have had a myocardial infarction.

Patients and healthcare professionals have rights and responsibilities as set out in the [NHS Constitution for England](#) – all NICE guidance is written to reflect these. Treatment and care should take into account individual needs and preferences. Patients should have the opportunity to make informed decisions about their care and treatment, in partnership with their healthcare professionals. If someone does not have the capacity to make decisions, healthcare professionals should follow the [Department of Health's advice on consent](#), the [code of practice that accompanies the Mental Capacity Act](#) and the supplementary [code of practice on deprivation of liberty safeguards](#). In Wales, healthcare professionals should follow [advice on consent from the Welsh Government](#).

NICE has produced guidance on the components of good patient experience in adult NHS services. All healthcare professionals should follow the recommendations in [Patient experience in adult NHS services](#).

Strength of recommendations

Some recommendations can be made with more certainty than others. The Guideline Development Group makes a recommendation based on the trade-off between the benefits and harms of an intervention, taking into account the quality of the underpinning evidence. For some interventions, the Guideline Development Group is confident that, given the information it has looked at, most patients would choose the intervention. The wording used in the recommendations in this guideline denotes the certainty with which the recommendation is made (the strength of the recommendation).

For all recommendations, NICE expects that there is discussion with the patient about the risks and benefits of the interventions, and their values and preferences. This discussion aims to help them to reach a fully informed decision (see also 'Patient-centred care').

Interventions that must (or must not) be used

We usually use 'must' or 'must not' only if there is a legal duty to apply the recommendation. Occasionally we use 'must' (or 'must not') if the consequences of not following the recommendation could be extremely serious or potentially life threatening.

Interventions that should (or should not) be used – a 'strong' recommendation

We use 'offer' (and similar words such as 'refer' or 'advise') when we are confident that, for the vast majority of patients, an intervention will do more good than harm, and be cost effective. We use similar forms of words (for example, 'Do not offer...') when we are confident that an intervention will not be of benefit for most patients.

Interventions that could be used

We use 'consider' when we are confident that an intervention will do more good than harm for most patients, and be cost effective, but other options may be similarly cost effective. The choice of intervention, and whether or not to have the intervention at all, is more likely to depend on the patient's values and preferences than for a strong recommendation, and so the healthcare professional should spend more time considering and discussing the options with the patient.

Recommendation wording in guideline updates

NICE began using this approach to denote the strength of recommendations in guidelines that started development after publication of the 2009 version of 'The guidelines manual' (January 2009). This does not apply to any recommendations shaded in grey and ending 2007 (see 'Update information' box below for details about how recommendations are labelled). In particular, for recommendations labelled [2007], the word 'consider' may not necessarily be used to denote the strength of the recommendation.

Update information

This guidance is an update of NICE clinical guideline 48 (published May 2007) and will replace it.

New recommendations have been added for secondary prevention in people who have had a myocardial infarction, following the advent of PPCI and to reflect new findings on enhancing people's uptake of cardiac rehabilitation, antiplatelet therapy in people with an additional indication for anticoagulation, omega-3 fatty acid supplementation, angiotensin-converting enzyme (ACE) inhibitors and beta-blockers.

You are invited to comment on the new and updated recommendations in this guideline. These are marked as **[2013]** if the evidence has been reviewed but no change has been made to the recommendation, or **[new 2013]** if the evidence has been reviewed and the recommendation has been added or updated.

You are also invited to comment on recommendations that NICE proposes to delete from the 2007 guideline, because either the evidence has been reviewed and the recommendations have been updated, or NICE has updated other relevant guidance and has replaced the original recommendations. Appendix A sets out these recommendations and includes details of replacement recommendations. Where there is no replacement recommendation, an explanation for the proposed deletion is given.

Where recommendations are shaded in grey and end **[2007]**, the evidence has not been reviewed since the original guideline. We will not be able to accept comments on these recommendations. Yellow shading in these recommendations indicates where wording changes have been made for the purposes of clarification only.

Where recommendations are shaded in grey and end **[2007, amended 2013]**, the evidence has not been reviewed but changes have been made to the recommendation wording that change the meaning (for example, because of

equalities duties or a change in the availability of drugs, or incorporated guidance has been updated). These changes are marked with yellow shading, and explanations of the reasons for the changes are given in appendix A for information. We will not be able to accept comments on these recommendations.

The original NICE guideline and supporting documents are available [here](#).

Key priorities for implementation

The following recommendations have been identified as priorities for implementation.

Cardiac rehabilitation after an acute myocardial infarction (MI)

- Offer cardiac rehabilitation programmes designed to motivate people to attend and complete the programme. Explain the benefits of attending. **[new 2013] [1.1.7]**
- Begin cardiac rehabilitation as soon as possible, before discharge from hospital and invite the person to a cardiac rehabilitation session. The session should take place within 10 days of their discharge from hospital. **[new 2013] [1.1.13]**

Lifestyle changes after an MI

- Advise people to eat a Mediterranean-style diet (more bread, fruit, vegetables and fish; less meat; and replace butter and cheese with products based on plant oils). **[2007] [1.2.1]**
- Advise people to be physically active for 20–30 minutes a day to the point of slight breathlessness. Advise people who are not active to this level to increase their activity in a gradual, step-by-step way, aiming to increase their exercise capacity. They should start at a level that is comfortable, and increase the duration and intensity of activity as they gain fitness. **[2007] [1.2.10]**
- Advise all people who smoke to stop and offer assistance from a smoking cessation service in line with [Brief interventions and referral for smoking cessation](#) (NICE public health guidance 1). **[2007] [1.2.12]**

Drug therapy

- Offer all patients who have had an acute MI treatment with the following drugs:
 - ACE (angiotensin-converting enzyme) inhibitor
 - **dual antiplatelet therapy** (aspirin **plus clopidogrel, prasugrel or ticagrelor**)

- beta-blocker
- statin. **[2007, amended 2013] [1.3.1]**

- Offer an assessment of left ventricular function to all patients who have had an MI. **[2007, amended 2013] [1.3.4]**
- Titrate the ACE inhibitor dose upwards at short intervals (for example, every 12–24 hours) before the person leaves hospital until the maximum tolerated or target dose is reached. If this is not possible, this should be completed within 4–6 weeks of hospital discharge. **[new 2013] [1.3.6]**
- Make arrangements (for example, in the discharge summary) to ensure that titration occurs up to the maximum tolerated or target dose. **[new 2013] [1.3.28]**

Communication of diagnosis and advice

- After an acute MI, confirmation of the diagnosis of acute MI and results of investigations, **incomplete drug titrations**, future management plans and advice on secondary prevention should be part of every discharge summary. **[2007, amended 2013] [1.6.1]**

1 Recommendations

The following guidance is based on the best available evidence. The [full guideline](#) gives details of the methods and the evidence used to develop the guidance.

1.1 *Cardiac rehabilitation after an acute myocardial infarction (MI)*

Comprehensive cardiac rehabilitation

- 1.1.1 All patients (regardless of their age) should be given advice about and offered a cardiac rehabilitation programme with an exercise component. **[2007]**
- 1.1.2 Cardiac rehabilitation programmes should provide a range of options, and patients should be encouraged to attend all those appropriate to their clinical needs. Patients should not be excluded from the entire programme if they choose not to attend certain components. **[2007]**
- 1.1.3 If a patient has cardiac or other clinical conditions that may worsen during exercise, these should be treated if possible before the patient is offered the exercise component of cardiac rehabilitation. For some patients, the exercise component may be adapted by an appropriately qualified healthcare professional. **[2007]**
- 1.1.4 Patients with left ventricular dysfunction who are stable can safely be offered the exercise component of cardiac rehabilitation. **[2007]**

Encouraging patients to attend

- 1.1.5 Deliver cardiac rehabilitation in a non-judgemental, respectful and culturally sensitive manner. Consider employing bilingual peer educators or cardiac rehabilitation assistants who reflect the diversity of the local population. **[new 2013]**

- 1.1.6 Establish patients' health beliefs and their specific illness perceptions, before offering appropriate lifestyle advice and to encourage attendance. **[new 2013]**
- 1.1.7 Offer cardiac rehabilitation programmes designed to motivate people to attend and complete the programme. Explain the benefits of attending. **[new 2013]**
- 1.1.8 Discuss with the person any factors that might stop them attending a cardiac rehabilitation programme, such as any transport difficulties. **[new 2013]**
- 1.1.9 Offer cardiac rehabilitation programmes in a choice of venues (including at the person's home, in hospital and in the community) and at a choice of times of day (for example, sessions outside of working hours). Explain the options available. **[new 2013]**
- 1.1.10 Provide a range of different types of exercise, as part of the programme, to meet the needs of people of all ages, or those with significant comorbidity. Do not exclude people from the whole programme if they choose not to attend specific components. **[new 2013]**
- 1.1.11 Offer single-sex classes if there is sufficient demand. **[new 2013]**
- 1.1.12 Enrol people who have had an MI in a system of structured care, with clear lines of responsibility, to arrange early initiation of cardiac rehabilitation. **[new 2013]**
- 1.1.13 Begin cardiac rehabilitation as soon as possible, before discharge from hospital and invite the person to a cardiac rehabilitation session. This session should take place within 10 days of their discharge from hospital. **[new 2013]**
- 1.1.14 Contact people who do not start or do not continue to attend the cardiac rehabilitation programme with a further reminder, such as:

- motivational letters
 - prearranged visits from a member of the cardiac rehabilitation team
 - telephone calls
 - a combination of the above. **[new 2013]**
- 1.1.15 Seek feedback from programme users and aim to use this to increase the number of people starting and attending the programme. **[new 2013]**
- 1.1.16 Be aware of the person's wider health and social needs. Offer information and sources of help on:
- economic issues
 - welfare rights
 - housing and social support issues. **[new 2013]**
- 1.1.17 Make cardiac rehabilitation equally accessible and relevant to all patients after an MI, particularly people from groups that are less likely to access this service. These include people from black and minority ethnic groups, older people, people from lower socioeconomic groups, women, people from rural communities and people with mental and physical health conditions. **[2013]**
- 1.1.18 Encourage all staff, including senior medical staff, involved in providing care for patients after an MI, to actively promote cardiac rehabilitation. **[2013]**

Health education and information needs

- 1.1.19 Comprehensive cardiac rehabilitation programmes should include health education and stress management components. **[2007]**
- 1.1.20 A home-based programme validated for patients who have had an MI (such as [The heart manual](#)) that incorporates education, exercise and stress management components with follow-ups by a

- trained facilitator may be used to provide comprehensive cardiac rehabilitation. **[2007]**
- 1.1.21 Take into account the physical and psychological status of the patient, the nature of their work and their work environment when giving advice on returning to work. **[2007]**
- 1.1.22 Be up to date with the latest Driver and Vehicle Licensing Agency (DVLA) guidelines. Regular updates are published on the [DVLA website](#). **[2007]**
- 1.1.23 After an MI without complications, people who wish to travel by air should seek advice from the [Civil Aviation Authority](#). People who have had a complicated MI need expert individual advice. **[2007, amended 2013]**
- 1.1.24 Patients who hold a pilot's licence should seek advice from the [Civil Aviation Authority](#). **[2007]**
- 1.1.25 Take into account the patient's physical and psychological status, as well as the type of activity planned when offering advice about the timing of returning to normal activities. **[2007]**
- 1.1.26 An estimate of the physical demand of a particular activity, and a comparison between activities, can be made using tables of metabolic equivalents (METs) of different activities (for further information, please refer to <http://www.cdc.gov/physicalactivity/everyone/measuring/index.html>). Advise patients how to use a perceived exertion scale to help monitor physiological demand. Patients who have had a complicated MI may need expert advice. **[2007]**
- 1.1.27 Advice on competitive sport may need expert assessment of function and risk, and is dependent on what sport is being discussed and the level of competitiveness. **[2007]**

Psychological and social support

- 1.1.28 Offer stress management in the context of comprehensive cardiac rehabilitation. **[2007]**
- 1.1.29 Do not routinely offer complex psychological interventions such as cognitive behavioural therapy. **[2007]**
- 1.1.30 Involve partners or carers in the cardiac rehabilitation programme if the patient wishes. **[2007]**
- 1.1.31 For recommendations on the management of patients with clinical anxiety or depression, refer to [Anxiety](#) (NICE clinical guideline 113), [Depression in adults](#) (NICE clinical guideline 90) and [Depression in adults with a chronic physical health problem](#) (NICE clinical guideline 91). **[2007]**

Sexual activity

- 1.1.32 Reassure patients that after recovery from an MI, sexual activity presents no greater risk of triggering a subsequent MI than if they had never had an MI. **[2007]**
- 1.1.33 Advise patients who have made an uncomplicated recovery after their MI that they can resume sexual activity when they feel comfortable to do so, usually after about 4 weeks. **[2007]**
- 1.1.34 Raise the subject of sexual activity with patients within the context of cardiac rehabilitation and aftercare. **[2007]**
- 1.1.35 When treating erectile dysfunction, treatment with a PDE5 (phosphodiesterase type 5) inhibitor may be considered in men who have had an MI more than 6 months earlier and who are now stable. **[2007]**
- 1.1.36 PDE5 inhibitors must be avoided in patients treated with nitrates or nicorandil because this can lead to dangerously low blood pressure. **[2007]**

1.2 *Lifestyle changes after an MI*

Changing diet

1.2.1 Advise people to eat a Mediterranean-style diet (more bread, fruit, vegetables and fish; less meat; and replace butter and cheese with products based on plant oils). **[2007]**

1.2.2 Do not routinely recommend eating oily fish for the sole purpose of preventing another MI. If people choose to consume oily fish, healthcare professionals should be aware that there is no evidence of harm, and fish may form part of a Mediterranean-style diet. **[new 2013]**

1.2.3 Do not offer or advise people to use the following to prevent another MI:

- omega-3 fatty acid capsules
- omega-3 fatty acid supplemented foods.

If people choose to take omega-3 fatty acid capsules or eat omega-3 fatty acid supplemented foods, healthcare professionals should be aware that there is no evidence of harm. **[new 2013]**

1.2.4 Advise people not to take supplements containing beta-carotene. Do not recommend antioxidant supplements (vitamin E and/or C) or folic acid to reduce cardiovascular risk. **[2007]**

1.2.5 Offer people an individual consultation to discuss diet, including their current eating habits, and advice on improving their diet. **[2007]**

1.2.6 Give people consistent dietary advice tailored to their needs. **[2007]**

1.2.7 Give people healthy eating advice that can be extended to the whole family. **[2007]**

Alcohol consumption

- 1.2.8 Advise people who drink alcohol to keep weekly consumption within safe limits (no more than 21 units of alcohol per week for men, or 14 units per weeks for women) and to avoid binge drinking (more than 3 alcoholic drinks in 1–2 hours). **[2007]**

Regular physical activity

- 1.2.9 Advise people to undertake regular physical activity sufficient to increase exercise capacity. **[2007]**
- 1.2.10 Advise people to be physically active for 20–30 minutes a day to the point of slight breathlessness. Advise people who are not active to this level to increase their activity in a gradual, step-by-step way, aiming to increase their exercise capacity. They should start at a level that is comfortable, and increase the duration and intensity of activity as they gain fitness. **[2007]**
- 1.2.11 Advice on physical activity should involve a discussion about current and past activity levels and preferences. The benefit of exercise may be enhanced by tailored advice from a suitably qualified professional. **[2007]**

Smoking cessation

- 1.2.12 Advise all people who smoke to stop and offer assistance from a smoking cessation service in line with [Brief interventions and referral for smoking cessation](#) (NICE public health guidance 1). **[2007]**
- 1.2.13 All patients who smoke and who have expressed a desire to quit should be offered support and advice, and referral to an intensive support service (for example, the NHS Stop Smoking Services) in line with [Brief interventions and referral for smoking cessation](#) (NICE public health guidance 1). If a patient is unable or unwilling to accept a referral they should be offered pharmacotherapy in line with the recommendations in [Smoking cessation services](#) (NICE public health guidance 10). **[2007]**

Weight management

- 1.2.14 After an MI, offer all patients who are overweight or obese advice and support to achieve and maintain a healthy weight in line with [Obesity](#) (NICE clinical guideline 43). **[2007]**

1.3 Drug therapy

- 1.3.1 Offer all patients who have had an acute MI treatment with the following drugs:

- ACE (angiotensin-converting enzyme) inhibitor
- dual antiplatelet therapy (aspirin plus clopidogrel, prasugrel or ticagrelor)
- beta-blocker
- statin. **[2007, amended 2013]**

- 1.3.2 Ensure that a clear management plan is available to the patient and sent to the GP, including:

- details and timing of any further drug titration
- monitoring of blood pressure
- monitoring of renal function. **[new 2013]**

- 1.3.3 Offer all patients an assessment of bleeding risk at their follow-up appointment. **[new 2013]**

- 1.3.4 Offer an assessment of left ventricular function to all patients who have had an MI. **[2013]**

ACE inhibitors

- 1.3.5 Offer people who present acutely with an MI an ACE inhibitor as soon as they are haemodynamically stable. Continue the ACE inhibitor indefinitely. **[new 2013]**

- 1.3.6 Titrate the ACE inhibitor dose upwards at short intervals (for example, every 12–24 hours) before the person leaves hospital until the maximum tolerated or target dose is reached. If this is not

possible, this should be completed within 4–6 weeks of hospital discharge. **[new 2013]**

1.3.7 Do not offer combined treatment with an ACE inhibitor and an angiotensin II receptor blocker (ARB) to patients early after an MI, unless there are other reasons to use this combination. **[new 2013]**

1.3.8 Offer people who are intolerant to ACE inhibitors an ARB instead of an ACE inhibitor after an MI. **[new 2013]**

1.3.9 Renal function, serum electrolytes and blood pressure should be measured before starting an ACE inhibitor or ARB and again within 1 or 2 weeks of starting treatment. Patients should be monitored as appropriate as the dose is titrated upwards, until the maximum tolerated or target dose is reached, and then at least annually. More frequent monitoring may be needed in patients who are at increased risk of deterioration in renal function. Patients with chronic heart failure should be monitored in line with [Chronic heart failure](#) (NICE clinical guideline 108). **[2007]**

People who have had a proven MI in the past (over a year ago)

1.3.10 Offer an ACE inhibitor to people who have had a proven MI in the past (more than 12 months ago). Titrate to the maximum tolerated or target dose and continue indefinitely. **[new 2013]**

1.3.11 Offer people who have had a proven MI in the past (more than 12 months ago) and are intolerant to ACE inhibitors an ARB instead of an ACE inhibitor. **[new 2013]**

Antiplatelet therapy

1.3.12 Offer clopidogrel for up to 12 months to:

- people who have had a non-ST-segment-elevation myocardial infarction (NSTEMI), regardless of treatment¹
- people who have had a STEMI and received a bare-metal or drug-eluting stent. **[new 2013]**

1.3.13 Offer clopidogrel for at least 1 month and consider continuing for up to 12 months to:

- people who have had a STEMI and medical management with or without reperfusion treatment with a fibrinolytic agent
- people who have had a STEMI and received coronary artery bypass grafting (CABG) surgery. **[new 2013]**

1.3.14 Offer aspirin to all patients after an MI, and continue it indefinitely, unless they are aspirin intolerant or have an indication for anticoagulation. Offer clopidogrel instead of aspirin if they have other clinical vascular disease, in line with [Clopidogrel and modified-release dipyridamole for the prevention of occlusive vascular events](#) (NICE technology appraisal guidance 210). **[2007, amended 2013]**

1.3.15 Offer aspirin to people who have had a proven MI more than 12 months ago. Offer clopidogrel if, in addition, they have other clinical vascular disease or are aspirin intolerant, in line with [Clopidogrel and modified-release dipyridamole for the prevention of occlusive vascular events](#) (NICE technology appraisal guidance 210). **[new 2013]**

1.3.16 For patients with aspirin hypersensitivity, clopidogrel monotherapy should be considered as an alternative treatment. **[2007]**

¹ This recommendation updates recommendation 1.3 in [Clopidogrel in the treatment of non-ST-segment-elevation acute coronary syndrome](#) (NICE technology appraisal guidance 80).

- 1.3.17 Patients with a history of dyspepsia should be considered for treatment in line with [Dyspepsia](#) (NICE clinical guideline 17). [2007, amended 2013]
- 1.3.18 After appropriate treatment, patients with a history of aspirin-induced ulcer bleeding whose ulcers have healed and who are negative for *Helicobacter pylori* should be considered for treatment in line with [Dyspepsia](#) (NICE clinical guideline 17). [2007, amended 2013]

Antiplatelet therapy in those with an indication for anticoagulation

- 1.3.19 Take into account the following when considering treatment for people with MI and an indication for anticoagulation:
- bleeding risk
 - thromboembolic risk
 - cardiovascular risk. [new 2013]
- 1.3.20 Unless there is a high risk of bleeding, continue anticoagulation and add aspirin to treatment in people who otherwise need anticoagulation and who:
- have had their condition managed medically
 - have undergone balloon angioplasty
 - have undergone CABG surgery. [new 2013]
- 1.3.21 Continue anticoagulation and add clopidogrel to treatment in people who have had an MI, who have undergone percutaneous coronary intervention (PCI) with bare-metal or drug-eluting stents and who otherwise need anticoagulation. [new 2013]
- 1.3.22 Offer clopidogrel with warfarin to people with a sensitivity to aspirin, who otherwise need anticoagulation and aspirin, and have had an MI. [new 2013]

- 1.3.23 Do not routinely offer warfarin in combination with prasugrel or ticagrelor to people who need anticoagulation, who have had an MI. **[new 2013]**
- 1.3.24 After 12 months, continue anticoagulation and take into consideration the need for ongoing antiplatelet therapy, taking into account:
- the indication for anticoagulation
 - thromboembolic risk
 - bleeding risk
 - cardiovascular risk
 - the person's wishes. **[new 2013]**
- 1.3.25 Do not offer a new oral anticoagulant (rivaroxaban, apixaban or dabigatran) in combination with dual antiplatelet therapy in people who otherwise need anticoagulation, who have had an MI. **[new 2013]**
- 1.3.26 Consider using warfarin and discontinuing treatment with a new oral anticoagulant (rivaroxaban, apixaban or dabigatran) in people who otherwise need anticoagulation and who have had an MI, unless there is a specific clinical indication to continue it. **[new 2013]**

Beta-blockers

- 1.3.27 Offer a beta-blocker as soon as possible after an MI, when the person is haemodynamically stable. **[new 2013]**
- 1.3.28 Make arrangements (for example, in the discharge summary) to ensure that titration occurs up to the maximum tolerated or target dose. **[new 2013]**
- 1.3.29 Continue a beta-blocker for at least 12 months in people without left ventricular systolic dysfunction or heart failure, after an acute MI. **[new 2013]**

- 1.3.30 Continue a beta-blocker indefinitely in people with left ventricular systolic dysfunction. **[new 2013]**
- 1.3.31 Offer all people who have had an MI in the past, who have left ventricular systolic dysfunction, a beta-blocker whether or not they have symptoms. Those with heart failure plus left ventricular dysfunction should have their condition managed in line with [Chronic heart failure](#) (NICE clinical guideline 108). **[new 2013]**
- 1.3.32 Do not offer people without left ventricular systolic dysfunction or heart failure, who have had an MI in the past, treatment with a beta-blocker unless there is an additional clinical indication for a beta-blocker. **[new 2013]**

Calcium channel blocker recommendations

- 1.3.33 Do not routinely offer calcium channel blockers to reduce cardiovascular risk after an MI. **[2007]**
- 1.3.34 If beta-blockers are contraindicated or need to be discontinued, diltiazem or verapamil may be considered for secondary prevention in patients without pulmonary congestion or left ventricular systolic dysfunction. **[2007]**
- 1.3.35 For patients who are stable after an MI, calcium channel blockers may be used to treat hypertension and/or angina. For patients with heart failure, use amlodipine, and avoid verapamil, diltiazem and short-acting dihydropyridine agents in line with [Chronic heart failure](#) (NICE clinical guideline 108). **[2007]**

Potassium channel activators

- 1.3.36 Do not offer nicorandil to reduce cardiovascular risk in patients after an MI. **[2007]**

Aldosterone antagonists in patients with heart failure and left ventricular dysfunction

- 1.3.37 For patients who have had an acute MI and who have symptoms and/or signs of heart failure and left ventricular systolic dysfunction, initiate treatment with an aldosterone antagonist licensed for post-MI treatment within 3–14 days of the MI, preferably after ACE inhibitor therapy. **[2007]**
- 1.3.38 Patients who have recently had an acute MI and have clinical heart failure and left ventricular systolic dysfunction, but who are already being treated with an aldosterone antagonist for a concomitant condition (for example, chronic heart failure), should continue with the aldosterone antagonist or an alternative, licensed for early post-MI treatment. **[2007]**
- 1.3.39 For patients who have had a proven MI in the past and heart failure due to left ventricular systolic dysfunction, treatment with an aldosterone antagonist should be in line with [Chronic heart failure](#) (NICE clinical guideline 108). **[2007]**
- 1.3.40 Monitor renal function and serum potassium before and during treatment with an aldosterone antagonist. If hyperkalaemia is a problem, halve the dose of the aldosterone antagonist or stop the drug. **[2007]**

Statins and other lipid lowering agents

- 1.3.41 Statin therapy is recommended for adults with clinical evidence of cardiovascular disease in line with [Statins for the prevention of cardiovascular events](#) (NICE technology appraisal guidance 94) and [Lipid modification](#) (NICE clinical guideline 67). **[2007]**

Recommendations regarding the use of statins and other lipid lowering agents have been removed from the update of the guideline. Recommendations on the use of statins and other lipid lowering agents can be found in NICE clinical guideline CG67 'Lipid modification' and NICE technology appraisal guidance 94 'Statins – cardiovascular disease'.

1.4 Coronary revascularisation after an MI

- 1.4.1 Offer everyone who has had an MI a cardiological assessment to consider whether coronary revascularisation is appropriate. This should take into account comorbidity. [2007]

1.5 Selected patient subgroups

Patients with hypertension

- 1.5.1 Treat hypertension in line with [Hypertension \(NICE clinical guideline 127\)](#). [2007, amended 2013]

Patients with left ventricular systolic dysfunction

- 1.5.2 Patients who have left ventricular systolic dysfunction should be considered for an implantable cardioverter defibrillator in line with [Implantable cardioverter defibrillators for arrhythmias](#) (NICE technology appraisal guidance 95). [2007]

1.6 Communication of diagnosis and advice recommendations

- 1.6.1 After an acute MI, confirmation of the diagnosis of acute MI and results of investigations, [incomplete drug titrations](#), future management plans and advice on secondary prevention should be part of every discharge summary. [2007, amended 2013]
- 1.6.2 Offer a copy of the discharge summary to the patient. [2007]

2 Research recommendations

The Guideline Development Group has made the following recommendations for research, based on its review of evidence, to improve NICE guidance and patient care in the future.

2.1 *In patients who are not revascularised after an MI, does clopidogrel and placebo have a better outcome than clopidogrel and aspirin?*

Why this is important

Standard antiplatelet therapy after an MI consists of dual therapy (DAPT) with aspirin and clopidogrel, which produces better outcomes than aspirin alone. Research has shown that new P2Y12 inhibitors improve on the outcomes with clopidogrel, when combined with aspirin, although bleeding and subsequently risk are increased.

Few studies have used P2Y12 inhibitors without aspirin. There are theoretical reasons why aspirin may detract from the vascular benefits of strong P2Y12 inhibitors. In addition, because clopidogrel alone produces at least the benefit of aspirin alone, it is possible that the supposed benefit of the combination of clopidogrel and aspirin over aspirin alone is due solely to the action of clopidogrel. Limited data on the use of clopidogrel alone in people with vascular diseases suggest the possibility that the addition of aspirin to clopidogrel gives little or no reduction in vascular event rate, at the cost of an increased risk of bleeding. A study of clopidogrel alone compared with clopidogrel and aspirin in people after MI would be valuable because of the potential preserved benefit and reduced risk of bleeding. This might lead to new strong P2Y12 inhibitors being assessed without concomitant aspirin.

2.2 *Does continuing beta-blocker treatment beyond 1 year in people with normal left ventricular systolic function, who have had an MI, improve outcomes?*

Why this is important

Recent cohort studies have suggested that continuing treatment with a beta-blocker beyond a year after an acute MI may not confer any benefit to the person in terms of reduced morbidity or mortality. This is particularly relevant given recent changes in acute management strategies. While beta-blockers are valuable in reducing mortality and morbidity for up to a year after an MI, they have side effects and represent an additional treatment burden to people who are already taking many other medications. However, there is also some suggestion that there are risks associated with withdrawal of beta-blockers in this population. The balance of risks and benefits of long-term beta blockade has not been clearly determined, particularly in the context of modern acute treatment of MI.

2.3 *Is treatment with an oral anticoagulant, aspirin and clopidogrel preferable to treatment with an oral anticoagulant and clopidogrel in people who have had an MI, have an indication for oral anticoagulation and are treated either medically, by primary percutaneous coronary intervention or by coronary artery bypass grafting surgery?*

Why this is important

Many people who have had an MI have indications for long-term treatment with both oral anticoagulants and combination antiplatelet drugs. Those with atrial fibrillation, mechanical heart valves or a history of pulmonary emboli are at high risk of stroke or thromboembolism and therefore need anticoagulation for the prevention of these events. It is well recognised that people receiving a combination of antiplatelet therapy and oral anticoagulation are at high risk of minor, major and fatal bleeding events. These outcomes are often recurrent

and associated with hospitalisation, blood transfusion and interventional procedures. The evidence review failed to find high-quality evidence to identify whether, in this population, treatment with triple therapy (an oral anticoagulant, plus dual antiplatelet therapy) or dual therapy (an oral anticoagulant plus clopidogrel) is more effective. The Guideline Development Group recognised that this question was important in an increasingly elderly population, who are more likely to have comorbidities and who are at a higher risk of bleeding.

2.4 *What characteristics are associated with uptake and adherence to cardiac rehabilitation after an acute MI when rehabilitation is started early?*

Why this is important

There is wide variation across the UK in style, staffing and resources of cardiac rehabilitation programmes. Participation in cardiac rehabilitation after an acute MI significantly reduces mortality and improves quality of life. However, data from the 2012 Myocardial Infarction National Audit Project (MINAP) highlight that only 44% of all patients take part in cardiac rehabilitation after an MI. This falls far short of the National Service Framework for Coronary Heart Disease (2000) target of more than 85% of people discharged from hospital after acute myocardial infarction. National audit data also highlight that patients are waiting on average 53 days to start the exercise component (Phase III) after an acute MI. Early cardiac rehabilitation (defined as attendance at a cardiac rehabilitation orientation appointment within 10 days) significantly improves attendance and is also cost-saving through reduced incidence of unplanned cardiac readmissions.

2.5 *In patients who have had a STEMI who undergo primary PCI with a bare-metal stent, after 4 weeks of aspirin and clopidogrel, is there an additional benefit to continuing clopidogrel for a further 11 months?*

Why this is important

There are no randomised controlled trials that provide data on long-term treatment with clopidogrel plus aspirin compared with aspirin alone in patients who are treated with primary PCI or medical therapy alone. Two large trials have provided data on short-term efficacy in medically treated STEMI patients (Commit/CCS-2, and Clarity – TIMI 28). In clinical practice, doctors extrapolate the data from patients with NSTEMI, in whom this problem has been studied in both medically and invasively managed patients, who receive clopidogrel for up to 12 months (CURE, PCI-CURE, CREDO) because of a reduction in composite end points including mortality. Whereas the risk of bleeding increases with dual antiplatelet therapy (aspirin with clopidogrel), it may be that the majority of benefit occurs in the short-term reduction of fatal and non-fatal re-infarction, and a reduced risk of stent thrombosis in patients treated with PCI.

3 Other information

3.1 *Scope and how this guideline was developed*

NICE guidelines are developed in accordance with a [scope](#) that defines what the guideline will and will not cover.

How this guideline was developed

NICE commissioned the National Clinical Guideline Centre to develop this guideline. The Centre established a Guideline Development Group (see section 4), which reviewed the evidence and developed the recommendations.

The methods and processes for developing NICE clinical guidelines are described in [The guidelines manual](#).

3.2 Related NICE guidance

Details are correct at the time of consultation on the guideline (June 2013). Further information is available on [the NICE website](#).

Published

General

- [Patient experience in adult NHS services](#). NICE clinical guidance 138 (2012).
- [Medicines adherence](#). NICE clinical guidance 76 (2009).

Condition-specific

- [Ticagrelor for the treatment of acute coronary syndromes](#). NICE technology appraisal guidance 236 (2011).
- [Hypertension](#). NICE clinical guideline 127 (2011).
- [Stable angina](#). NICE clinical guideline 126 (2011).
- [Anxiety](#). NICE clinical guideline 113 (2011).
- [Clopidogrel and modified-release dipyridamole from the prevention of occlusive vascular events \(review of technology appraisal guidance 90\)](#). NICE technology appraisal guidance 210 (2010).
- [Chronic heart failure](#). NICE clinical guideline 108 (2010).
- [Prevention of cardiovascular disease](#). NICE public health guidance 25 (2010).

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- [Chest pain of recent onset](#). NICE clinical guideline 95 (2010).
- [Unstable angina and NSTEMI](#). NICE clinical guideline 94 (2010).
- [Depression in adults with a chronic physical health problem](#). NICE clinical guideline 91 (2009).
- [Depression in adults \(update\)](#). NICE clinical guideline 90 (2009).
- [Prasugrel for the treatment of acute coronary syndromes with percutaneous coronary intervention](#). NICE technology appraisal guidance 182 (2009).
- [Familial hypercholesterolaemia](#). NICE clinical guideline 71 (2008).
- [Drug-eluting stents for the treatment of coronary artery disease \(part review of technology appraisal guidance 71\)](#). NICE technology appraisal guidance 152 (2008).
- [Lipid modification](#). NICE clinical guideline 67 (2008).
- [Smoking cessation services](#). NICE public health guidance 10 (2008).
- [Obesity](#). NICE clinical guideline 43 (2006).
- [Brief interventions and referral for smoking cessation](#). NICE public health guidance 1 (2006).
- [Implantable cardioverter defibrillators for arrhythmias \(review of technology appraisal guidance 11\)](#). NICE technology appraisal guidance 95 (2006).
- [Statins for the prevention of cardiovascular disease](#). NICE technology appraisal guidance 94 (2006).
- [Guidance on the use of coronary artery stents](#). NICE technology appraisal guidance 71 (2003).

Under development

NICE is developing the following guidance (details available from [the NICE website](#)):

- [Myocardial infarction with ST-segment-elevation \(STEMI\)](#). NICE clinical guideline. Publication expected July 2013.
- [Lipid modification \(update\)](#). NICE clinical guideline. Publication expected July 2014.

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- [Prasugrel with percutaneous coronary intervention for treating acute coronary syndrome \(review of technology appraisal guidance 182\)](#). NICE technology appraisal guidance. Publication expected August 2014.
- [Dyspepsia/gastro-oesophageal reflux disease](#). NICE clinical guideline. Publication date to be confirmed.

4 The Guideline Development Group, National Collaborating Centre and NICE project team

4.1 *Guideline Development Group*

Philip Adams

Emeritus Consultant Cardiologist, The Newcastle Hospitals NHS Foundation Trust

Ivan Bennet

GP with an interest in cardiology and Clinical Director, Central Manchester Clinical Commissioning Board

Kathryn Carver

Cardiac Rehabilitation Lead Nurse, Cambridge University Hospitals NHS Foundation Trust

William Cunningham

GP, Northumberland

Jennifer Jones

Director of Prevention, Training and Education, Croi Cardiac Foundation National University of Ireland Galway

Caroline Levie

Practitioner with a special interest in cardiology, County Durham and Darlington NHS Trust

Joseph Mills (until July 2012)

Consultant Cardiologist and Interventional Cardiologist, Liverpool Heart and Chest Hospital NHS Foundation Trust

Jerry Murphy

Professor of Cardiovascular Medicine, University of Durham

Sanjay Ramdany

Community Matron with a special interest in CHD and Visiting Lecturer, University of Southampton

Linda Speck

Consultant Clinical Health Psychologist, Abertawe Bro Morgannwg University Health Board, Wales and Visiting Professor of Health Psychology, University of South Wales.

John Walsh

Patient member

Maria Wray

Patient member

Paul Wright

Principle cardiac pharmacist, Barts Health NHS Trust

Robert Wright (from September 2012)

Consultant cardiologist with a special interest in interventional cardiology, South Tees Hospitals NHS Foundation Trust

4.2 *National Clinical Guideline Centre*

Joanna Ashe

Senior information scientist

Elizabeth Avital (until August 2012)

Associate Director

Daria Bilan (until February 2012)

Information scientist

Elisabetta Fenu (from August 2012)

Health economic lead

Jennifer Hill (from August 2012)

Operations Director

Katie Jones

Project manager

Kate Lovibond (until August 2012)

Senior health economist

Julie Neilson

Senior research fellow

Juan Carlos Rejon (from June 2012 – February 2013)

Health economist

Leanne Saxon

Research fellow

4.3 NICE project team

Phil Alderson

Associate Director

Clifford Middleton (until May 2013), Claire Ruiz (from May 2013)

Guideline Commissioning Manager

Carl Dawood

Guideline Coordinator

Judith Thornton

Technical Lead

Jasdeep Hayre

Health Economist

Jaimella Espley (until May 2013), Annette Mead (from May 2013)

Editor

Appendix A: Recommendations from NICE clinical guideline 48 (2007) that have been deleted or changed

Recommendations to be deleted

The table shows recommendations from 2007 that NICE proposes deleting in the 2013 update. The right-hand column gives the replacement recommendation, or explains the reason for the deletion if there is no replacement recommendation.

Recommendation in 2007 guideline	Comment
Patients should be advised to consume at least 7 g of omega 3 fatty acids per week from two to four portions of oily fish. [1.1.1.2]	Replaced by recommendation 1.2.2
For patients who have had an MI within 3 months and who are not achieving 7 g of omega 3 fatty acids per week, consider providing at least 1 g daily of omega-3 acid ethyl esters treatment licensed for secondary prevention post MI for up to 4 years. [1.1.1.3].	Replaced by recommendation 1.2.3.
Initiation of omega-3-acid ethyl esters supplements is not routinely recommended for patients who have had an MI more than 3 months earlier [1.1.1.4].	Replaced by recommendation 1.2.3.
Healthcare professionals should take into account patients' wider health and social needs, which may involve identifying and addressing economic, welfare rights, housing or social support issues. This may be a particular issue for patients in more deprived circumstances, and rehabilitation services should assess the likely scale of these needs when planning how their services meet the needs of the local population. [1.2.2.2]	Replaced by recommendations 1.1.5 – 1.1.16.
Cardiac rehabilitation programmes should be culturally sensitive. Employing bilingual peer educators or cardiac rehabilitation assistants who reflect the diversity of the local population should be considered. [1.2.2.3]	Replaced by recommendations 1.1.5 – 1.1.16.
Cardiac rehabilitation programmes should include an exercise component designed to meet the needs of older patients or patients with significant	Replaced by recommendations 1.1.5 – 1.1.16.

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comorbidity. Any transport problems should be addressed. [1.2.2.4]	
Healthcare professionals should ask patients whether they would prefer single-sex or mixed classes. [1.2.2.5].	Replaced by recommendations 1.1.5 – 1.1.16.
Healthcare professionals should establish patients' health beliefs and level of health literacy before offering appropriate lifestyle advice [1.2.2.6].	Replaced by recommendations 1.1.5 – 1.1.16.
Reminders such as: <ul style="list-style-type: none"> • telephone calls • telephone calls in combination with direct contact from a healthcare professional • motivational letters should be used to improve uptake of cardiac rehabilitation [1.2.2.8].	Replaced by recommendations 1.1.5 – 1.1.16.
Early after presenting with an acute MI, all patients should be offered an ACE inhibitor [1.3.2.1].	Replaced by recommendations 1.3.5 – 1.3.8.
ACE inhibitor therapy should be initiated at the appropriate dose and titrated upwards at short intervals (for example every 1 to 2 weeks) until the maximum tolerated or target dose is reached [1.3.2.2].	Replaced by recommendations 1.3.5 – 1.3.8.
After an MI, all patients with preserved left ventricular function or with left ventricular systolic dysfunction should continue treatment with an ACE inhibitor indefinitely, whether or not they have symptoms of heart failure [1.3.2.4].	Replaced by recommendations 1.3.5 – 1.3.8.
Routine prescription of angiotensin receptor blockers (ARBs) after an acute MI is not recommended [1.3.2.5]	Replaced by recommendations 1.3.5 – 1.3.8.
For patients after an acute MI who have had to discontinue an ACE inhibitor because of intolerance (for example because of cough) or allergy, an ARB should be substituted [1.3.2.6].	Replaced by recommendations 1.3.5 – 1.3.8.
Combined treatment with an ACE inhibitor and an ARB is not recommended for routine use in patients early after an acute MI with heart failure and/or left ventricular systolic dysfunction [1.3.2.7].	Replaced by recommendations 1.3.5 – 1.3.8.
In patients with a proven MI in the past (more than 1 year ago) and with heart failure and left ventricular systolic dysfunction, ACE inhibitor and ARB treatment should be in line with 'Chronic	Replaced by recommendations 1.3.10 – 1.3.11 NICE clinical guideline 5 has been replaced by NICE clinical guideline 108.

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heart failure' (NICE clinical guideline 5) [1.3.2.8].	
In patients with a proven MI in the past and with left ventricular systolic dysfunction, who are asymptomatic, ACE inhibitor treatment should be offered and the dose titrated upwards, as tolerated, to the effective clinical dose for patients with heart failure and left ventricular systolic dysfunction [1.3.2.9].	Replaced by recommendations 1.3.10 – 1.3.11
In patients with a proven MI in the past without heart failure and with preserved left ventricular function, ACE inhibitor treatment should be offered and the dose titrated upwards, as tolerated, to the effective clinical dose [1.3.2.10].	Replaced by recommendations 1.3.10 – 1.3.11
In patients with a proven MI in the past with left ventricular systolic dysfunction, who are symptomatic and who have had to discontinue an ACE inhibitor because of intolerance (for example because of cough) or allergy, an ARB should be substituted [1.3.2.11].	Replaced by recommendations 1.3.10 – 1.3.11
Clopidogrel should not be offered as first-line monotherapy after an MI [1.3.3.2].	Replaced by recommendations 1.3.12 – 1.3.18
Clopidogrel, in combination with low-dose aspirin, is recommended for use in the management of non-ST-segment-elevation acute coronary syndrome in people who are at moderate to high risk of MI or death [1.3.3.3].	Replaced by recommendations 1.3.12 – 1.3.18
People at moderate to high risk of MI or death, presenting with non-ST-segment elevation acute coronary syndrome can be determined by clinical signs and symptoms, accompanied by one or both of the following: <ul style="list-style-type: none"> the results of clinical investigations, such as new ECG changes (other than persistent ST segment elevation) indicating ongoing myocardial ischaemia, particularly dynamic or unstable patterns the presence of raised blood levels of markers of cardiac cell damage such as troponin [1.3.3.4]. 	Replaced by recommendations 1.3.12 – 1.3.18
Treatment with clopidogrel in combination with low-dose aspirin should be continued for 12 months after the most recent acute episode of non-ST-segment- elevation acute coronary syndrome. Thereafter, standard care,	Replaced by recommendations 1.3.12 – 1.3.18

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<p>including treatment with low- dose aspirin alone, is recommended, unless there are other indications to continue dual antiplatelet therapy [1.3.3.5].</p>	
<p>After an ST-segment-elevation MI, patients treated with a combination of aspirin and clopidogrel during the first 24 hours after the MI should continue treatment for at least 4 weeks. Thereafter, standard treatment including low-dose aspirin should be given, unless there are other indications to continue dual antiplatelet therapy [1.3.3.6].</p>	<p>Replaced by recommendations 1.3.12 – 1.3.18</p>
<p>If the patient has not been treated with a combination of aspirin and clopidogrel during the acute phase of an MI, this combination should not routinely be initiated [1.3.3.7].</p>	<p>Replaced by recommendations 1.3.12 – 1.3.18</p>
<p>The combination of aspirin and clopidogrel is not recommended for routine use for any longer than 12 months after the acute phase of MI, unless there are other indications to continue dual antiplatelet therapy, and the combination is usually recommended for a shorter duration after an ST-segment-elevation MI [1.3.3.8].</p>	<p>Replaced by recommendations 1.3.12 – 1.3.18</p>
<p>Early after an acute MI, all patients without left ventricular systolic dysfunction or with left ventricular systolic dysfunction (symptomatic or asymptomatic) should be offered treatment with a beta-blocker [1.3.4.1].</p>	<p>Replaced by recommendations 1.3.27 – 1.3.32</p>
<p>For patients after an MI with left ventricular systolic dysfunction, who are being offered treatment with a beta-blocker, clinicians may prefer to consider treatment with a beta-blocker licensed for use in heart failure [1.3.4.2]</p>	<p>Replaced by recommendations 1.3.27 – 1.3.32</p>
<p>Beta-blockers should be continued indefinitely after an acute MI [1.3.4.3].</p>	<p>Replaced by recommendations 1.3.27 – 1.3.32</p>
<p>After a proven MI in the past, all patients with left ventricular systolic dysfunction should be offered treatment with a beta-blocker whether or not they have symptoms, and those with heart failure plus left ventricular dysfunction should be managed in line with 'Chronic heart failure' (NICE clinical guideline 5) [1.3.4.4].</p>	<p>Replaced by recommendations 1.3.27 – 1.3.32 NICE clinical guideline 5 has been replaced by NICE clinical guideline 108</p>
<p>After a proven MI in the past, patients with preserved left ventricular function</p>	<p>Replaced by recommendations 1.3.27 – 1.3.32</p>

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<p>who are asymptomatic, should be routinely offered treatment with a beta-blocker, unless they are identified to be at increased risk of further cardiovascular events, or there are other compelling indications for beta-blocker treatment [1.3.4.5]</p>	
<p>Beta-blockers should be initiated as soon as possible when the patient is clinically stable and titrated upwards to the maximum tolerated dose [1.3.4.6].</p>	<p>Replaced by recommendations 1.3.27 – 1.3.32</p>
<p>For patients who have had an MI, high-intensity warfarin (INR >3) should not be considered as an alternative to aspirin in first-line treatment. [1.3.5.1]</p>	<p>Recommendations regarding the use of warfarin alone as a secondary preventive measure have been removed from this update of the guideline. It was felt that the inclusion of such recommendations in the context of the development of new antiplatelet agents, particularly considering the rarity of intolerance to both aspirin and clopidogrel, was unnecessary and potentially confusing.</p>
<p>For patients who have had an MI and are unable to tolerate either aspirin or clopidogrel, treatment with moderate-intensity warfarin (INR 2–3) should be considered for up to 4 years, and possibly longer. [1.3.5.2]</p>	<p>Recommendations regarding the use of warfarin alone as a secondary preventive measure have been removed from this update of the guideline. It was felt that the inclusion of such recommendations in the context of the development of new antiplatelet agents, particularly considering the rarity of intolerance to both aspirin and clopidogrel, was unnecessary and potentially confusing.</p>
<p>For patients who have had an acute MI, are intolerant to clopidogrel and have a low risk of bleeding, treatment with aspirin and moderate-intensity warfarin (INR 2-3) combined should be considered [1.3.5.3].</p>	<p>Recommendations regarding the combination of anticoagulation and antiplatelet therapy have been replaced by recommendations 1.3.19 – 1.3.26.</p>
<p>For patients already being treated for another indication (mechanical valve, recurrent deep vein thrombosis, atrial fibrillation, left ventricular thrombus), warfarin should be continued. For patients treated with moderate-intensity warfarin (INR 2-3) and who are at low risk of bleeding, the addition of aspirin should be considered. [1.3.5.4]</p>	<p>Recommendations regarding the combination of anticoagulation and antiplatelet therapy have been replaced by recommendations 1.3.19 – 1.3.26.</p>
<p>The combination of warfarin and clopidogrel is not routinely recommendation. [1.3.5.5]</p>	<p>Recommendations regarding the combination of anticoagulation and antiplatelet therapy have been replaced by recommendations 1.3.19 – 1.3.26.</p>
<p>After an MI, all patients should be offered treatment with a statin as soon as</p>	<p>Recommendations regarding the use of statins and other lipid lowering agents have been removed from the update of</p>

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<p>possible. [1.3.9.2]</p>	<p>the guideline. Recommendations on the use of statins and other lipid lowering agents can be found in NICE clinical guideline CG67 'Lipid modification' and NICE technology appraisal guidance 94 'Statins – cardiovascular disease'.</p>
<p>The decision whether to initiate statin therapy should be made after an informed discussion between the healthcare professional and the individual about the risks and benefits of statin treatment, and taking into account additional factors such as comorbidities and life expectancy. [1.3.9.3]</p>	<p>Recommendations regarding the use of statins and other lipid lowering agents have been removed from the update of the guideline. Recommendations on the use of statins and other lipid lowering agents can be found in NICE clinical guideline CG67 'Lipid modification' and NICE technology appraisal guidance 94 'Statins – cardiovascular disease'.</p>
<p>Baseline liver enzymes should be measured before initiation of a statin. [1.3.9.4]</p>	<p>Recommendations regarding the use of statins and other lipid lowering agents have been removed from the update of the guideline. Recommendations on the use of statins and other lipid lowering agents can be found in NICE clinical guideline CG67 'Lipid modification' and NICE technology appraisal guidance 94 'Statins – cardiovascular disease'.</p>
<p>Patients who have raised liver enzymes should not routinely be excluded from statin therapy. [1.3.9.5]</p>	<p>Recommendations regarding the use of statins and other lipid lowering agents have been removed from the update of the guideline. Recommendations on the use of statins and other lipid lowering agents can be found in NICE clinical guideline CG67 'Lipid modification' and NICE technology appraisal guidance 94 'Statins – cardiovascular disease'.</p>
<p>When the decision has been made to prescribe a statin, it is recommended that therapy should usually be initiated with a drug with a low acquisition cost (taking into account required daily dose and product price per dose). [1.3.9.6]</p>	<p>Recommendations regarding the use of statins and other lipid lowering agents have been removed from the update of the guideline. Recommendations on the use of statins and other lipid lowering agents can be found in NICE clinical guideline CG67 'Lipid modification' and NICE technology appraisal guidance 94 'Statins – cardiovascular disease'.</p>
<p>Patients who are intolerant of statins should be considered for other lipid lowering agents. [1.3.9.7]</p>	<p>Recommendations regarding the use of statins and other lipid lowering agents have been removed from the update of the guideline. Recommendations on the use of statins and other lipid lowering agents can be found in NICE clinical guideline CG67 'Lipid modification' and NICE technology appraisal guidance 94 'Statins – cardiovascular disease'.</p>
<p>Routine monitoring of creatine kinase in asymptomatic patients who are being</p>	<p>Recommendations regarding the use of statins and other lipid lowering agents</p>

<p>treated with a statin after an MI is not recommended. [1.3.9.8]</p>	<p>have been removed from the update of the guideline. Recommendations on the use of statins and other lipid lowering agents can be found in NICE clinical guideline CG67 'Lipid modification' and NICE technology appraisal guidance 94 'Statins – cardiovascular disease'.</p>
<p>Patients who are being treated with a statin and who develop muscle symptoms (pain, tenderness or weakness) should be advised to seek medical advice so that creatine kinase can be measured. [1.3.9.9]</p>	<p>Recommendations regarding the use of statins and other lipid lowering agents have been removed from the update of the guideline. Recommendations on the use of statins and other lipid lowering agents can be found in NICE clinical guideline CG67 'Lipid modification' and NICE technology appraisal guidance 94 'Statins – cardiovascular disease'.</p>
<p>The dose of any statin may need to be reduced or stopped if there are issues surrounding the metabolic pathway, food and/or drug interactions and/or concomitant illness. [1.3.9.10]</p>	<p>Recommendations regarding the use of statins and other lipid lowering agents have been removed from the update of the guideline. Recommendations on the use of statins and other lipid lowering agents can be found in NICE clinical guideline CG67 'Lipid modification' and NICE technology appraisal guidance 94 'Statins – cardiovascular disease'.</p>
<p>Statin should be discontinued in patients who develop peripheral neuropathy that may be attributable to the statin treatment, and further advice from a specialist should be sought. [1.3.9.11]</p>	<p>Recommendations regarding the use of statins and other lipid lowering agents have been removed from the update of the guideline. Recommendations on the use of statins and other lipid lowering agents can be found in NICE clinical guideline CG67 'Lipid modification' and NICE technology appraisal guidance 94 'Statins – cardiovascular disease'.</p>

Amended recommendation wording (change to meaning)

Recommendations are labelled [2007, amended 2013] if the evidence has not been reviewed but changes have been made to the recommendation wording (indicated by highlighted text) that change the meaning.

<p>Recommendation in 2007 guideline</p>	<p>Recommendation in current guideline</p>	<p>Reason for change</p>
<p>After an MI without complications, patients can usually travel by air within 2 –3 weeks. Patients who have had a complicated MI need expert individual advice. [1.2.3.5]</p>	<p>After an MI without complications, people who wish to travel by air should seek advice from the Civil Aviation Authority. People who have had a complicated MI need expert individual advice</p>	<p>Amended to reflect updated information on air travel after an MI from the Civil Aviation Authority.</p>

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<p>All patients who have had an acute MI should be offered treatment with a combination of the following drugs:</p> <ul style="list-style-type: none"> • ACE (angiotensin-converting enzyme) inhibitor • aspirin • beta-blocker • statin. [1.3.1.1] 	<p>Offer all patients who have had an acute MI treatment with the following drugs:</p> <ul style="list-style-type: none"> • ACE (angiotensin-converting enzyme) inhibitor • dual antiplatelet therapy (aspirin plus clopidogrel, prasugrel or ticagrelor) • beta-blocker • statin. 	<p>Amended to reflect that dual antiplatelet therapy should be given to all patients after an MI (excluding those with contraindications).</p>
<p>Aspirin should be offered to all patients after an MI and should be continued indefinitely. [1.3.3.1]</p>	<p>Offer aspirin to all patients after an MI, and continue it indefinitely, unless they are aspirin intolerant or have an indication for anticoagulation. Offer clopidogrel instead of aspirin if they have other clinical vascular disease, in line with NICE technology appraisal guidance 210.</p>	<p>Amended to include situations where aspirin would not be offered indefinitely and related NICE technology appraisal guidance.</p>
<p>After an acute MI, confirmation of the diagnosis of acute MI and results of investigations, future management plans and advice on secondary prevention should be part of every discharge summary. [1.6.1]</p>	<p>After an acute MI, confirmation of the diagnosis of acute MI and results of investigations, incomplete titrations, future management plans and advice on secondary prevention should be part of every discharge summary.</p>	<p>Recommendation amended to reflect the importance of including details of any incomplete titrations in the discharge summary. This reflects new recommendations on titration of ACE inhibitors and beta-blockers included in the guideline update.</p>

Changes to recommendation wording for clarification only (no change to meaning)

Recommendation numbers in current guideline	Comment
1.3.17	Recommendation amended to remove information relating to treatment of people with a history of dyspepsia.
1.3.18	Recommendation amended to remove information relating to treatment of people with a history of dyspepsia.
1.5.1	Recommendation amended to remove information relating to the blood pressure target for people with hypertension who have had an MI and update the cross reference to the NICE guideline on 'Hypertension'.